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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/517,987	03/03/2000	Kuei-Wu Huang	94-C-096C2	5571
30425	7590	09/09/2004	EXAMINER	
STMICROELECTRONICS, INC.			BOOTH, RICHARD A	
MAIL STATION 2346			ART UNIT	
1310 ELECTRONICS DRIVE			PAPER NUMBER	
CARROLLTON, TX 75006			2812	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



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**MAILED**  
SEP 9 - 2004  
**GROUP 2800**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/517,987  
Filing Date: March 03, 2000  
Appellant(s): HUANG ET AL.

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Daniel E. Venglarik  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 6/14/04.

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**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: the rejection of claims 77-96 over Pierce in view of Doan has been withdrawn by the examiner.

**(7) *Grouping of Claims***

The appellant's statement in the brief that certain claims do not stand or fall together is not agreed with because the rejection of claims 77-96 over Pierce in view of Doan has been withdrawn by the examiner. Therefore, group A should not include claims 87, 90, and 93-95 which are part of groups B and C.

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**(8) Claims Appealed**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) Prior Art of Record**

4,841,347	HSU	6-1989
5,346,587	DOAN	9-1994
5,079,180	RODDER ET AL.	1-1992

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 77, 81-90, and 92-96 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu, U.S. Patent 4,841,347.

Hsu shows the invention as claimed including a substrate 12; a field oxide 10 over the substrate, the field oxide 10 having an opening therethrough to a surface of a substrate; a gate electrode 28 over the surface of the substrate and within the opening, the gate electrode having insulating material 16 on a bottom and on two sides 40 of the electrode between the source and drain regions, wherein the insulating material on the

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bottom of the gate electrode contacts the substrate; and source and drain regions (24,26) adjacent the insulating material on the gate electrode, each source and drain region including a first portion (14,16) in the substrate and a second portion 50 on the substrate over the first portion and adjacent to the insulating material on the sides of the gate electrode, the first portion being more lightly doped than the second portion, and the first and second portions together function as a source or drain for a device including the gate electrode (see figures 1-10 and col. 2-line 7 to col. 3-line 43).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 78-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu, U.S. Patent 4,841,347 in view of Doan et al., U.S. Patent 5,346,587.

Hsu is applied as above but fails to expressly disclose that the field oxide opening has vertical sidewalls. Doan et al. discloses either forming a bird's beak field oxide to create a slanted wall opening 32 (see Figure 3) or a straight walled vertical field oxide 52 (see Figure 5). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the structure of Hsu so as to form a straight walled opening for the field oxide because this is an appropriate form of isolation and the removal of the bird's beak will allow for higher integration.

Claim 91 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu, U.S. Patent 4,841,347 in view of Rodder et al., U.S. Patent 5,079,180.

Hsu is applied as above but fails to expressly disclose where the first portions of the source and drain include LDD and heavily doped regions. Rodder et al. discloses a raised source/drain structure where LDD regions and heavily doped regions are formed in the substrate (see fig. 2D and col. 5-lines 5-19). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the LDD structure of Rodder et al. in the primary reference of Hsu because LDD structures have several well known benefits including the reduction of hot carriers which degrade the gate oxide.

#### **(11) Response to Argument**

Appellant's arguments are persuasive with respect to the rejection under 35 USC 103 of Pierce in view of Doan et al. and that rejection has been withdrawn. However, appellant's arguments have been fully considered but they are not persuasive with respect to the rejections under 35 USC 102 and 35 USC 103 regarding the Hsu reference. Appellant argues that the Hsu reference fails to disclose that the doped epitaxial layer regions 50 function together with the regions (24,26) as source/drain regions. The examiner respectfully disagrees since the structure of the doped regions (50,24,26) in Hsu is the same structure as shown in appellant's specification in fig. 5A, for example, as region 40 of appellant's specification is also a doped epitaxial layer.

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Clearly, since the epitaxial region 50 of Hsu and source/drain regions (24,26) are in electrical contact with each other, they must necessarily function together as source/drain regions as required by the independent claims of the instant appeal. With respect to appellant's argument regarding the layer 54 of refractory metal silicide in Hsu, the function of this layer is irrelevant since this feature is not claimed and is not relied upon in any of the examiner's rejections.

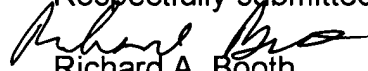
Concerning the argument that claims 87 and 90 are not shown by the Hsu reference, the term "LDD" includes the relative phrase "lightly doped" and since claims are to be given their broadest reasonable interpretation and there is no standard to define the phrase "lightly doped", the Hsu reference reads on these claims. Furthermore, the particular dose used in Hsu to form the source/drain regions 24,26 (see col. 2-lines 26-29) is of a level which will form doping regions of lower concentration compared to conventional source/drain regions.

With respect to claim 93, note that again the Hsu reference shows the same structure as in appellant's specification. Namely, there is an oxide layer (see fig. 5A of appellant's specification and fig. 10 of Hsu) in Hsu on a bottom 16 and sides 40 of a gate electrode 20 forming a gate oxide between the gate electrode and a source region 24 and between the gate electrode and a drain region 26.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,




Richard A. Booth  
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September 6, 2004

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